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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,749	10/24/2000	CLAUDIA B. JAFFE	01-050210US	2329

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QUINE INTELLECTUAL PROPERTY LAW GROUP, P.C.
P O BOX 458
ALAMEDA, CA 94501

EXAMINER

BROWN, JENNINE M

ART UNIT	PAPER NUMBER
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1743

DATE MAILED: 11/15/2002

11

Please find below and/or attached an Office communication concerning this application or proceeding.

10A

Office Action Summary

Application No.

09/696,749

Applicant(s)

JAFFE, CLAUDIA B.

Examiner

Jennine M. Brown

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) 29-57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6,7,9. 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-28, drawn to A Microfluidic Device, classified in class 204, subclass 600.
- II. Claims 29-57, drawn to A Method of Performing a Separation, classified in class 204, subclass 450.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case Invention I can be used with a different process for separating ions like in a water purifier whereas Invention II is for a process of separating biological materials.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Johnathan Quine on 11/01/2002 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-28. Affirmation of this election must be made by applicant in replying to this

Office action. Claims 29-57 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(1) Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. How "deep" is the deep mixing channel? How "shallow" is the shallow separation channel and how much of a relative difference is there between the two? It is not possible in this claim to ascertain the requisite degree of "deep" and "shallow" necessary to determine the scope of the invention.

(2) In claims 2-9 and 19-22, Applicants claim "deep" and "shallow" channels respectively but the **claimed ranges overlap** within the ranges given to determine deep and shallow therefore it is not possible to ascertain the requisite degree of "deep" and "shallow" necessary to determine the scope of the invention.

(3) While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947). The term "an electroosmotic pump" in claims 25-27 are used by the claim to mean "a pump," while the accepted meaning is "electromotive force." Electroosmotic properties are electronically driven phenomena because electrodes cause the sample to move by electrostatic interactions while pump

and vacuum phenomena generally occur because an inert gas is applied to a closed system to propel a liquid or a vacuum is generated to extract a liquid from a closed system. These fluid movement properties are not the same and the terminology should be more consistent with the phenomena that drive the motion of the liquid.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-9 and 16-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Taylor, et al. (US 6375817).

Taylor et al. teach a microfluidic device having a plurality of channels (Figure 4; col. 4, l. 5-9; col. 8, l. 40-42) a deep channel and a shallow channel with cross sectional areas (col. 2, l. 66-67; col. 5, l. 2-15) having a pressure source in fluid communication with the channel (col. 5, l. 16-50) to introduce one or more samples (col. 4, l. 36-63) and an electrokinetic controller to transport one or more samples through the separation channel by voltage (col. 3, l. 10-15). The channel depth ranges from 0.1 μm to 1000 μm (col. 8, l. 40-47) and the channel widths range from 10 μm to 100 μm (col.

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8, l. 40-47). The separation channel has a separation matrix comprising agarose or polyacrylamide gel (col. 5, l. 42-44; col. 7, l. 11-18). The pressure source can be positive pressure (col. 5, l. 18-20) or negative pressure otherwise known as vacuum (col. 6, l. 61-67). One pressure source is an electroosmotic pump. Buffer or salt is used in the channels (col. 3, l. 2-3, 9). Plug injection is used to move the injected sample from the injection channel to the separation channel (col. 2, l. 23-58).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor, et al. (US 6375817) as applied to claims 1-9, 16-28 above, and further in view of Christel, et al. (US 6368871).

Taylor, et al. teach a microfluidic device as described previously. Taylor, et al. do not specify the ratio of depth to width. Christel, et al. teach the depth to width ration is 2:1, 10:1 or more preferably 20:1 (col. 2, l. 49-55; col. 7, l. 44-47; col. 12, l. 60-61).

It would have been obvious to one of ordinary skill in the art to modify the apparatus of Taylor, et al. to use the modified depths because the increased surface area is ideal for mixing of fluids because mixing by diffusion can be very slow and the deeper the channel, the greater surface area which should decrease the length necessary to mix in the channels, making the devices more compact and less expensive to manufacture.

Relevant Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5965410 teaches different widths and depths for channels used in a microfluidic device with electrical control.

US 6174675 teaches a multiport device with novel channel configurations with first and second intersecting channel regions and electrical control.

US 6471841 teaches an electroosmotic flow microfluidic system using gel matrix.

US 6416642 teaches pressure injection, sample stacking or electrokinetic injection and wicking or pressure to move liquid in a microfluidic system.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennine M. Brown whose telephone number is (703) 305-0435. The examiner can normally be reached on M-F 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 879-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

jmb
November 12, 2002


Jill Warden
Supervisory Patent Examiner
Technology Center 1700